Mechanical Integrated Services and Technologies (MIST)

All deliverables and requirements must follow the guidelines in NNG15CR64C with no exceptions

<u>Task Order Statement of Work (SOW)</u>

Date: 03/18/19
Task Name: WFIRST Mechanical Engineering Observatory/Spacecraft Support
Task No. / Mod: *154/8*
Task Monitor (TM) : **Redacted**
Contract number: NNG15CR64C

I. Background: The Wide-Field Infrared Survey Telescope (WFIRST) is a NASA mission that addresses the Astronomy and Astrophysics 2010 Decadal Survey top priority recommendations in the large space mission category. WFIRST will provide answers to the questions such as: why is the expansion rate of the universe accelerating? And are there other solar systems and Earth like planets? The current WFIRST design of the mission makes use of an existing 2.4m telescope to enhance sensitivity and imaging performance. WFIRST has a Wide Field Instrument that will deliver observations for Dark Energy and Planetary Census surveys, along with a technology development Coronagraph that will accelerate the search for Earth-like planets.

II. Scope of Work

Personnel must be proficient in the use of MICROSOFT OFFICE, CAD software (PTC-CREO), and/or FEMAP and NASTRAN and able to perform Mechanical & analytical modeling of spacecraft and instrument structures & Mechanisms, with a particular emphasis on structures made of composite materials. Extensive knowledge of how composite structures are built is required.

1. The Contractor shall provide engineering support services in support of the WFIRST Project. Subtasks 1 through 3 will end by May 1, 2019. April 1 is the estimated start date for the following subtask divisions.

There will be a reshuffling of work to different Subtasks to match the government WBS structure:
Subtask 4: 6.3.1 SC Primary Structure (e, i, j, m, z, ae, ag)
Subtask 5: 6.3.9 OBA Support (i, aa, ab,)
Subtask 6: 6.3.5 SASS Support (f, i)
Subtask 7: 6.3.8 SC MGSE Support (g, I v,w, ac)
Subtask 8: Instrument Lower Shade Support (af)
Subtask 9: 6.3.4 ST-IRU Support (x, y)

This shall include:

a. Mechanical Engineering lead support for development of the WFIRST Observatory/Spacecraft deployment systems. (High Gain Antenna System (HGAS) and Solar Array Support System and evaluate potential vendors. Travel may be required. (SASS)). (Scope is removed and put on a separate task for HGAS)

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e. Observatory/Spacecraft support in all planning, and leadership for observatory integration and testing, spacecraft design, analysis, manufacturing expertise, integration and testing, and the associated MGSE for Observatory and SC processing and evaluate potential vendors. Travel may be required. (Move to Subtask 4.0.) (**REDACTED**)

f. SASS Mechanical design support. Must have experience designing deployable systems using CREO and preferably WINDCHILL. Move to Subtask 6.0. (**REDACTED**)

g. Provide SC MGSE Engineering support through all sub-element and SC verification phases. (Move to Subtask 7.0) (**REDACTED**)

i. Purchasing support shall be provided for IT equipment, applications, tools, instruments, actuators, motors, and systems used to support the spacecraft and observatory team. Purchase circuit board fabrication and assembly for engineering units. Purchase of composite material. Increase the funding by **REDACTED** for the procurement of SC forgings and large plate material used for SC PS and large MGSE, and the OBA building block joints.

j. Jr Engineering Summer Interns used to support SC modeling development. (Move to Subtask 4.0.)

k. HGAS Mechanical design support requiring experience with CREO and preferably WINDCHILL(Scope is removed and put on a separate task for HGAS)

m. Mechanical Technician support for the Observatory and Spacecraft fabrication of mockups, Engineering Test Units, and ground support equipment. (Move to Subtask 4.0)

o. Completed SC Mockup

t. Provide one senior Electrical Engineer (**REDACTED**), one FPGA electrical engineer (**REDACTED**), and one software engineer (**REDACTED**) with gimbal controller electronics experience. This support will be provided and tracked on a separate Subtask #2. These persons will be responsible for HGAS GCE breadboard/ETU card development work and report to the gimbal lead engineer. (Scope is removed and put on a separate task for Gimbal Support)

u. Provide experienced electrical engineering designer personnel. This support will be provided and tracked on a separate Subtask #2. These person(s) will be responsible for updating the electrical schematics, updating the board layout, perform card analysis work as requested, and laying out the trace and part placement details so the WFIRST gimbal control electronics (GCE) card is ready to manufacture

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and report to the gimbal lead engineer (**REDACTED**). (Scope is removed and put on a separate task for Gimbal Support)

v. SES design support for the OBS TVAC test configuration to help develop derived TVAC test requirements. (**REDACTED**) (Moving to I&T task).

w. SES engineering support to help develop the requirements from Thermal, optics, Systems teams. This involves the facilitation of the meetings to obtain the input needed to determine whether the SES is large enough and capable enough to work as the test facility for planning. (**REDACTED**) (Moving to I&T task).

x. ST-IRU engineering support to help determine the material selection and whether the alignment budget is a good requirement. (**REDACTED**) (Move to Subtask 9.0)

y. ST-IRU design support for any changes to flexures, radiators, and ST brackets on the panel. (**REDACTED**) (Move to Subtask 9.0)

z. Provide OBS/SC Engineering/ Design support for modeling and developing the SC interfaces and level 4 requirements that allow routing and mounting for the Observatory harnesses (**REDACTED**) (Move to Subtask 4).

aa. Provide design support for the OBA (**REDACTED**) Changed scope. (Move to Subtask 5).

ab. Provide Outer Barrel Assembly (OBA) Engineering Support and evaluate potential vendors. Travel may be required. (**REDACTED**) (Move to Subtask 5).

ac. Provide MGSE design support for all aspects of subsystems, systems, and observatory. (**REDACTED**) (Move to Subtask 7).

ad. Provide Gimbal Control Engineer support for the HGAS. (**REDACTED**) (Scope is removed and put on a separate task for Gimbal Support)

ae. Provide SC to Launch Vehicle Mechanical System Engineering support. (**REDACTED**) Subtask 4.

af. Provide Designer Support for the Instrument Lower Shade support. (**REDACTED**) Subtask 8.

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ag. Provide SC design support for Primary Structure. (**REDACTED**) Subtask 4.

Support Description and Expected Level of Effort continued in Mod 8

SUPPORT DESCRIPTION	ELOE (WYE)
a.) HGAS Mechanical Engineer (Removed to another task)	**REDACTED**
e.) Sr Project staff engineer for Obs/SC support	**REDACTED**
f.) SASS Mechanical Designer	**REDACTED**
g.) OBS-SC MGSE Mechanical Engineers	**REDACTED**
i.) Increase procurement dollars **REDACTED**	**REDACTED**
j.) Summer Interns (Technical Writers)	**REDACTED**
k) Sr Mechanical Designer for HGAS (Removed to another task)	**REDACTED**
m.) Mechanical Technician for OBS/SC mockup fabrication	**REDACTED**
o.) Full scale mockup design (modified to lift and put on horizontal shaker) (Completed)	**REDACTED**
t.) Electrical Engineer Support for Gimbal Control Electronics (GCE) subtask 2 (Removed to another task)	**REDACTED**

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u.) Electrical Design Support for GCE board (Removed to another task)	**REDACTED**
v.)SES/ACF Mechanical Designer (Thru POP)	**REDACTED**
w.)SES/ACF Mechanical Engineer (Thru POP)	**REDACTED**
x.)ST-IRU Mechanical Engineer for 6 mo (Thru POP)	**REDACTED**
y.)ST-IRU Mechanical Designer for 6 mo (Thru POP)	**REDACTED**
z.) OBS/SC harness Engineer/Designer (New start April)	**REDACTED**
aa.)OBA Designer Support	**REDACTED**
ab.)OBA Engineering Support	**REDACTED**
ac.) MGSE design support Subtask 4	**REDACTED**
ad.) Gimbal Control Engineering support(Removed to another task)	**REDACTED**
ae.) LV Mechanical Systems Support	**REDACTED**
af.) Instrument Lower Shade Design Support	**REDACTED**
ag.) SC Primary Structure Design Support	**REDACTED**

III.   Deliverables/Schedules/Milestones

Ref#	Deliverables	Due Date
2	• Ad-hoc reports as requested by the program office • Monthly progress report on task status and planning	Monthly

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Period of performance for this task will be **October 1, 2018 through September 30, 2019.**

IV.   ODC (Travel and Procurement)

Move forward the travel identified from previous task mod to this year..

V.   Work Location

Support work is to be performed on the GSFC-Greenbelt campus.
Mockup fabrication support can take place off GSFC campus.

VI.   Security Requirements

The contractor shall comply with Information Technology Security procedures and requirements as defined by NPR 2810.1A in the performance of this task. In addition, the contractor shall comply with all applicable federal rules and regulations and agency directives.

The Contractor shall adhere to project requirements regarding ITAR related information, as controlled by the ITAR, 22 CFR 120-130, by the U.S. Department of State. Any transfer of controlled information to a foreign person or entity requires an export license issued by the U.S. Department of State or an ITAR exemption to the license requirement prior to the export or transfer.

VII.   Data Rights

This SOW shall adhere to the following Data Rights clause, as stated in this contract: "the default Data Rights clause under this contract is FAR 52.227-14 RIGHTS IN DATA-GENERAL as modified by NASA FAR Supplement 1852.227-14-Alternate II and Alternate III and GSFC 52.227-90. Any exceptions to this clause will be covered by FAR 52.227-17 RIGHTS IN DATA-SPECIAL WORKS as modified by NASA FAR Supplement 1852.227-17, and, if applicable, GSFC 52-227.93."

VIII.   Applicable Documents

EXAMPLE: In the performance of this task, the contractor shall comply with the following documents:

1. *NPR 7150.2A   NASA Software Engineering Requirements*
2. *GPR 7150   Goddard Software Engineering Requirements*